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Effect of rock minerals on the crude oil combustion characterized by thermogravimetry coupled with fourier transform infrared spectroscopy (TG-FTIR)

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Abstract

© SGEM2018. Air injection technology, including high–pressure air injection and in-situ combustion, is an effective method for enhanced oil recovery (EOR). It is widely accepted that, in an air injection process, the oxidation of crude oil plays an important role in the displacement mechanism in an in-situ combustion process. In recent years, thermal analysis techniques have become highly important tools for the investigation of crude oil combustion. Thermogravimetry (TG/DTG) have been widely used to characterize the oxidation behavior of the crude oil combustion process. Air injection technology can be used for different reservoirs, such as sandstone reservoir and carbonate reservoir. Therefore, the rock mineral components will have an important effect on the oxidation process of crude oil. In this research, the effect of three different minerals (dolomite, calcite and kaolinite) on the oxidation behavior of crude oil was investigated using TG/DTG-FTIR experiments. The results showed that the presence of rock minerals has a great influence on the oxidation behavior. The presence of dolomite, kaolinite and calcite merged the FD and HTO process into one reaction region and made the coke formation and its combustion more of a continuous reaction process. In general, with the addition of rock minerals, the oxidation reaction regions of crude oil were shifted to lower temperature regions. The effect of these mineral on the FD and HTO of the Iraq oil in turns are: calcite > kaolinite > dolomite.

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Keywords

Air injection, Crude oil, Oxidation, Rock minerals

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